

CALIFORNIA COASTAL COMMISSION

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REGULAR CALENDAR
STAFF REPORT AND PRELIMINARY RECOMMENDATION

Application No.: 6-98-133

Applicant: Paul F. Gozzo, Jerry Sawtelle and Arnold G. Fischer Agent: Bob Trettin

Description: Construction of a 13 ft. high, 2 ft. wide, approximately 120 foot-long seawall at the base of a coastal bluff fronting two properties, containing residential units. This application is a follow-up to an emergency permit granted for the construction of the seawall.

Site: On public beach fronting 528-554 Neptune Avenue, Encinitas, San Diego County. APN(s) 256-084-08 and 09

STAFF NOTES:Summary of Staff's Preliminary Recommendation:

This application is the follow-up permit to emergency permit #6-96-6-G issued by the Commission on January 17, 1996. Construction of the seawall has been completed. The staff is recommending approval of the proposed follow-up application with special conditions requiring payment of an in-lieu fee to mitigate loss of sand; monitoring of the seawall's condition and performance, recordation of deed restrictions addressing future erosion and assumption of risks; certification that the seawall will be storm resistant; and future maintenance. With these conditions, impacts of the seawall on coastal resources will be minimized or mitigated, consistent with Chapter 3 Policies of the Coastal Act.

Substantive File Documents: Certified City of Encinitas Local Coastal Program (LCP); City of Encinitas MUP/CDP #95-137 and Resolution PC-97-18; Geotechnical and Geological Investigation 470 through 554 Neptune Avenue by Earth Systems Design Group dated October 26, 1992; Update Geotechnical Review, Upper Bluff Retention 528-532 Neptune Avenue by Soil Engineering Construction dated August 20, 1996; ; Update Geotechnical Review, Lower Bluff Seawall 528-554 Neptune Avenue by Soil Engineering Construction dated December 11, 1995; CDP Nos. 6-93-

131, 6-95-66, 6-96-6-G, 6-96-122-G and 6-98-39. U.S. Army Corps of Engineers, Los Angeles District (September 1991) State of the Coast Report, San Diego Region (CCSTWS), and all Technical Support Documents prepared for this study; San Diego Association of Governments (July 1993) Shoreline Preservation Strategy (including technical report appendices, The Planners Handbook, Beachfill Guidelines, and Seacliffs, Setbacks and Seawalls Report); Stone, Katherine E. and Benjamin Kaufman (July 1988) "Sand Rights: A Legal System to Protect the 'Shores of the Sea'", Journal of the American Shore and Beach Preservation Association, Vol. 56, No. 3, pp. 8 - 14; Tait, J.F. and Gary B. Griggs (1990) "Beach Response to the Presence of a Seawall," Journal of the American Shore and Beach Preservation Association, Vol. 58, No. 2, pp. 11 - 28; Group Delta Consultants, Inc. (November 3, 1993) "Shoreline Erosion Evaluation Encinitas Coastline, San Diego County, California" prepared for Mr. and Mrs. Richard Cramer (Project No. 1404-EC01); Everts, Craig (1991) "Seacliff Retreat and Coarse Sediment Yields in Southern California," Proceedings of Coastal Sediments '91, Specialty Conference/WR Div./ASCE, Seattle WA; Sunamura, T. (1983) "Processes of Sea Cliff and Platform Erosion," in CRC Handbook of Coastal Processes and Erosion, P.D. Komar (ed), CRC Press, Boca Raton, FL; Beach Bluff Erosion Technical Report for the City of Encinitas by Zeiser Kling Consultants, Inc. dated January 24, 1994; Sterrett, E.H. and R.E. Flick. "Shoreline Erosion Atlas." Shoreline Erosion Assessment and Atlas of the San Diego Region, vol. II. Sacramento, California: California Department of Boating and Waterways, 1994; Reconnaissance Report for the Encinitas Shoreline by the U.S. Army Corps of Engineers, dated March 1996; Final Draft Technical Report for the City of Encinitas Comprehensive Coastal Bluff and Shoreline Plan by Moffatt and Nichol Engineers, dated February 1996

PRELIMINARY STAFF RECOMMENDATION:

The staff recommends the Commission adopt the following resolution:

I. Approval with Conditions.

The Commission hereby grants a permit for the proposed development, subject to the conditions below, on the grounds that the development will be in conformity with the provisions of Chapter 3 of the California Coastal Act of 1976, will not prejudice the ability of the local government having jurisdiction over the area to prepare a Local Coastal Program conforming to the provisions of Chapter 3 of the Coastal Act, and will not have any significant adverse impacts on the environment within the meaning of the California Environmental Quality Act.

II. Standard Conditions.

See attached page.

III. Special Conditions.

The permit is subject to the following conditions:

1. Mitigation for Impacts to Sand Supply. PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, and within 60 days of Commission action, the applicants shall provide evidence, in a form and content acceptable to the Executive Director, that a total fee of \$9,967.82 has been deposited in an interest bearing account designated by the Executive Director, in-lieu of providing sand to replace the sand and beach area that would be lost due to the impacts of the proposed protective structure. The methodology used to determine the appropriate mitigation fee for the subject site(s) is that described in the staff report dated 11/18/98 prepared for coastal development permit #6-98-133. All interest earned shall be payable to the account for the purposes stated below.

The purpose of the account shall be to establish a beach sand replenishment fund to aid SANDAG, or a Commission-approved alternate entity, in the restoration of the beaches within San Diego County. The funds shall solely be used to implement projects which provide sand to the region's beaches, not to fund operations, maintenance or planning studies. The funds shall be released only upon approval of an appropriate project by the Executive Director of the Coastal Commission. The funds shall be released as provided for in a MOA between SANDAG, or a Commission-approved alternate entity, and the Commission, setting forth terms and conditions to assure that the in-lieu fee will be expended in the manner intended by the Commission. In the event the MOA is terminated, the Commission can appoint an alternative entity to administer the fund.

2. Monitoring Program. PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, and within 60 days of Commission action, the applicant shall submit to the Executive Director for review and written approval, a plan prepared by a licensed geologist or geotechnical engineer for a seawall monitoring program which includes the following:

- a. An evaluation of the current condition and performance of the seawall, addressing whether any significant weathering or damage has occurred that would adversely impact the future performance of the plugs.
- b. Current measurements of the distance between the residences and the bluff edge (as defined by PRC Section 13577) at 3 or more locations taken within 60 days of Commission action. The locations for these measurements shall be identified through permanent markers, benchmarks, survey position, written description, etc. so that annual measurements can be taken at the same bluff location and comparisons between years can provide information on bluff retreat.

- c. Current measurements of any differential retreat between the natural bluff face and the seawall taken at 20-foot intervals (maximum) along the top of the seawall/bluff face intersection. The program shall describe the method by which such measurements shall be taken.
- d. Current measurements of the retreat of the lower bluff within 10 feet of the northern end of the seawall, and comparison of this retreat with the historic retreat rate (referred to as "normal rate" in November 30, 1998 letter from John Niven to Gary Cannon).
- e. Provisions for taking the measurements called for in Subsections b., c. and d. above and for conducting the evaluation described in Subsection a. above annually in April of each year for three years beginning with April 1999.
- f. Provisions for annual preparation of a written summary of the wall evaluation and all measurements. This summary shall include a projection based on both the measured and historic retreat rates, of the year in which the return wall will likely be flanked by erosion. When 75% of the return walls have been exposed, the report shall provide recommendations on alternatives, changes or modifications to the project to address possible future flanking.
- g. Provisions for submittal of a report to the Executive Director of the Coastal Commission on May 1 of each year for three years beginning May 1, 1999. Each report shall be prepared by a licensed geologist or geotechnical engineer. The report shall contain the measurements and evaluation required in Subsections a., b., c., and e. above. The report shall also summarize all measurements and provide an analysis of trends, annual retreat or rate of retreat. The report shall include the written summary required in Subsection e. In addition, each report shall contain recommendations, if any, for necessary changes or modifications to the project.
- h. Provisions for submission of a report containing the information identified in Subsection e. above at 3 year intervals following the last annual report (i.e., the first of these triennial reports to be submitted on May 1, 2004); however, reports shall be submitted in the Spring of any year in which the following event occurs:
 - 1. A 20-year storm event
 - 2. An "El Niño" storm event
 - 3. A major tectonic event magnitude 5.5 or greater affecting San Diego County

Thus reports may be submitted more frequently depending on the occurrence of the above events in any given year.

The permittee shall undertake monitoring in accordance with the approved plan. Any proposed changes to the approved plan shall be reported to the Executive Director. No changes to the plan shall occur without a Coastal Commission approved amendment to this coastal development permit unless the Executive Director determines that no amendment is required.

3. Future Response to Erosion. PRIOR TO THE ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, and within 60 days of Commission action, the applicants shall execute and record a deed restriction against the two blufftop parcels in a form and content acceptable to the Executive Director, which shall provide that no additional bluff or shoreline protective devices shall be constructed on the adjacent public bluff face or beach unless the alternatives required below are demonstrated to be infeasible. In the event any bluff or additional shoreline protective work is considered on public property in the future, the applicants acknowledge that as a condition of filing an application for a coastal development permit, the applicants must provide the Commission and the City of Encinitas with sufficient evidence enabling it to consider all alternatives to bluff or shoreline protective works that will eliminate additional impacts to public resources, including, but not limited to, removal of accessory structures (patios, decks, etc.), installation of a below-grade retention system seaward of the residential structures on the applicant's property, underpinning of the residential structures, or other remedial measures capable of stabilizing the principle structure and providing reasonable use of the property, without construction of bluff or shoreline stabilization devices on the adjacent public resource, i.e coastal bluffs and beaches. The document shall be recorded free of all prior liens and encumbrances and shall run with the land and bind all successors and assigns.

4. Assumption of Risk. PRIOR TO ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, and within 60 days of Commission action, each applicant shall execute and record a deed restriction, in a form and content acceptable to the Executive Director, which shall provide: (a) that the applicant understands that the site may be subject to extraordinary hazard from storms, wave runup and flooding, and the applicant assumes the liability from such hazards; and (b) the applicant unconditionally waives any claim of liability on the part of the Commission or its successors in interest for damage from such hazards and agrees to indemnify and hold harmless the Commission, its officers, agents, and employees relative to the Commission's approval of the project for any damage due to natural hazards. The document shall run with the land, binding all successors and assigns, and shall be recorded free of prior liens that the Executive Director determines may affect the enforceability of the restriction. This deed restriction shall not be removed or changed without a Coastal Commission-approved amendment to this coastal development permit unless the Executive Director determines that no amendment is required.

5. Storm Design. PRIOR TO THE ISSUANCE OF THE COASTAL DEVELOPMENT PERMIT, and within 60 days of Commission action, the applicant shall submit certification by a registered civil engineer that the proposed shoreline protective device is designed to withstand storms comparable to the winter storms of 1982-83.

6. Future Maintenance. The permittee shall maintain the permitted seawall in its approved state except to the extent necessary to comply with the requirements set forth below. Maintenance of the seawall shall include maintaining the color, texture and integrity. Any change in the design of the project or future additions/reinforcement of the seawall beyond minor regrouting or other exempt maintenance, as defined by Section 13252 of the California Code of Regulations, will require a coastal development permit. However, in all cases after inspection, if it is apparent that repair and maintenance is necessary, the permittee shall contact the Commission office to determine whether permits are necessary.

IV. Findings and Declarations.

The Commission finds and declares as follows:

1. Detailed Project Description/History. The proposed project involves the construction of a 13 ft. high, approximately 120 foot-long "cast in place" concrete seawall with tiebacks at the base of an approximately 95 ft. high coastal bluff fronting two properties containing residential units. The subject seawall will be approximately 2 ft. thick and will follow the natural contour of the bluff. The face of the proposed seawall has been designed for both coloring, texturing and sculpting to allow for a more natural appearance. The proposed seawall will be attached to an identically designed, 480-ft. long seawall to the south which was approved by the Commission in November, 1993 (CDP# 6-93-131). In addition, and similar to the seawall to the south, the proposed wall will be "keyed" so that an additional wall could be added above the proposed wall should conditions warrant such in the future.

The subject seawall development lies seaward of the mean high tide line (MHTL). Therefore, although the City of Encinitas has a certified local coastal program, the project is within the Commission's original permit jurisdiction. State Lands Commission has indicated that generally the MHTL follows the toe of the bluff in the City of Encinitas. On January 17, 1996, and after documentation of an emergency, an emergency permit for the construction of the subject seawall proposed was approved for construction (#6-96-6-G). This application represents the follow-up coastal development permit to that emergency permit.

The subject development is located at the base of an approximately 95 ft. high, privately owned, coastal bluff on the west side of Neptune Avenue in Encinitas fronting two residential lots. An approximately 75 ft. wide upper bluff retention system has been installed approximately 15 ft. inland of the bluff edge in the rear yard of the southern lot. The retention system consists of caissons, tie-back, grouting and a grade beam all located below ground level.

The upper bluff retention system lies within an area of the City of Encinitas' coastal permitting authority and within the Commission's appeals jurisdiction. However, the City's LCP does not grant the City the ability to issue emergency permits. Therefore, after documentation of an emergency, the Commission issued an emergency permit for

the construction of the upper bluff retention system on August 23, 1996 (6-96-122-G). In addition, the City issued the required follow-up permit for the retention system on March 6, 1997 (City of Encinitas CDP #95-137). In addition, an existing wooded stairway leads down toward the beach on the northern face of the bluff. The lower portion of the stairway has been destroyed over time preventing any private access to the beach. The stairway was constructed prior to the Coastal Act of 1972.

Although the City of Encinitas has a certified LCP and has been issuing coastal development permits since May of 1995, the proposed development is located within the Commission's area of original jurisdiction where permit jurisdiction is not delegated to the local government. As such, the standard of review is Chapter 3 policies of the Coastal Act, with the certified LCP used as guidance.

2. Geologic Conditions and Hazards. Section 30235 of the Coastal Act states, in part:

Revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls, and other such construction that alters natural shoreline processes shall be permitted when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion, and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply.

In addition, Section 30253 of the Coastal Act states, in part:

New development shall:

(1) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.

(2) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs...

Coastal Act Section 30235 acknowledges that seawalls, revetments, cliff retaining walls, groins and other such structural or "hard" solutions alter natural shoreline processes. Thus, such devices are required to be approved only when necessary to protect existing structures in danger from erosion. The Coastal Act does not require the Commission to approve shoreline altering devices to protect vacant land or in connection with construction of new development. A shoreline protective device proposed in those situations is likely to be inconsistent with various other Coastal Act policies. For example, Section 30253 addresses new development and requires that it be sited and designed to avoid the need for protective devices that would substantially alter natural landforms along bluffs and cliffs.

In addition, the Commission has generally interpreted Section 30235 to require the Commission to approve shoreline protection only for existing principal structures. The Commission must always consider the specifics of each individual project, but has found in many instances that accessory structures such as patios, decks and stairways are not required to be protected under Section 30235 or can be protected from erosion by relocation or other means that does not involve shoreline protection. The Commission has historically permitted at grade structures within the geologic setback area recognizing they are expendable and capable of being removed rather than requiring a protective device that alters natural landforms along bluffs and cliffs.

Pursuant to Section 30253 of the Coastal Act, in approving new development on blufftop lots, structures are required to be setback an appropriate distance (based on a site specific geotechnical report) from the edge of the bluff that will allow for the natural process of erosion without triggering the need for a seawall. This "geologic setback area" is so designated to accommodate the natural erosion of the bluff. In other words, on blufftop lots, residences are set back from the bluff edge to allow the natural process of erosion to occur on the site without causing the residence to be threatened. Thus, at some future point when evidence of some erosion of the setback area is identified (even undercutting and subsequent block failures), this does not necessarily confirm the need for bluff or shore protection to protect the residence.

The vertical seawall is proposed to protect existing homes. A geotechnical and geological investigation was performed in 1992 for blufftop properties from 470 to 554 (subject address) Neptune Avenue attempting to document the need for shoreline protection. The applicant has submitted an updated geotechnical report which documents failures that have occurred at the subject site since the 1992 report. The report verifies the necessity of providing protection for the existing residential structures and also addresses the appropriateness of the selected seawall design. The report indicates that in the Fall of 1995 a mid-bluff failure of approximately 20-ft. by 30 ft. occurred on the subject southern lot and included a portion of the neighboring property to the south. In addition, lower portions of the subject bluff's Torrey Sandstone have failed to near vertical and, at the toe of the bluff, an approximately 6 ft. deep undercut has developed. On the adjacent property to the north of the subject site, unpermitted structures including a seawall, shotcrete and mid-bluff structures have failed resulting in repeated bluff failures.

The proposed seawall will front two existing lots containing residential structures. The southern lot contains a single-family residence and accessory cottage. The northern lot contains a duplex. Documentation submitted by the applicant's engineer indicates that on the southern lot the distance of the existing single-family residence to the edge of bluff ranges from 7 1/2 to 21 feet. The distance between the bluff edge and the duplex on the northern lot has been estimated at 40 feet. The conclusions reached in the submitted geotechnical report indicate that the projected failure surface for the bluff fronting each of the subject properties would intersect the bluff under the residential units with a factor of safety of less than 1.5; indicating that the bluff is only marginally stable and that if some method of stabilization is not provided, slope failure may occur. While typically a

minimum 40 foot setback is deemed safe for structures along this span of coastal bluffs, the subject site, as noted previously, has recently experienced serious bluff failures on both the south and north sides. The geotechnical report states that based upon its survey data, the installation of the seawall is "imperative to prevent imminent substantial failure of a degree sufficient to impact the residential structures on the site." Based on the above, the Commission finds that a shoreline altering device in the form of the proposed seawall must be approved pursuant to Section 30235 of the Coastal Act.

Although construction of a seawall is required to protect the existing principle structures on the site, Section 30235 of the Coastal Act requires that the shoreline protection be designed to eliminate or mitigate adverse impacts on local shoreline sand supply. There are a number of adverse impacts to public resources associated with the construction of shoreline structures. The natural shoreline processes referenced in Section 30235, such as the formation and retention of sandy beaches, may be altered by construction of a seawall, since bluff retreat is one of several ways that beach area and beach quality sand is added to the shoreline. This retreat is a natural process resulting from many different factors such as erosion by wave action causing cave formation, enlargement and eventual collapse, saturation of the bluff soil from ground water causing the bluff to slough off and natural bluff deterioration. When a seawall is constructed on the beach at the toe of the bluff, it directly impedes these natural processes.

Many of the effects of a structure on the beach are temporary or difficult to distinguish from all the other actions which modify the shoreline. Nevertheless, some of the effects which a structure may have on natural shoreline processes can be quantified. Three of the effects from a shoreline protective device which can be quantified are: 1) loss of the beach area on which the structure is located; 2) the long-term loss of beach which will result when the back beach location is fixed on an eroding shoreline; and 3) the amount of material which would have been supplied to the beach if the back beach or bluff were to erode naturally.

Based on review of the proposed seawall application, the Commission finds that the following impacts on beach sand supply would result from construction of the proposed seawall. The proposed seawall, which is approximately 120 ft. long by 24 inches thick, will encroach onto and permanently displace an estimated 216 sq. ft. of public beach area that is currently available for public use. In addition, over the expected life of the seawall, it is estimated that an additional 486 sq. ft. of public beach area will be lost to public use due to the seawall's prevention of the landward migration of the beach in this location (based on information provided by the applicant's engineer that the expected life of the seawall is approximately 22.5 years and the long-term erosion rate at the base of the bluff is .2 ft. per year). Finally, based on a rough approximation of current and future bluff profiles, it is estimated that approximately 1211.06 cubic yards of beach quality sand will be deprived the beach over the life of the seawall due to the seawall's effect on the natural processes of the bluff.

Special Condition #1 requires the applicant to deposit an in-lieu fee to fund beach sand replenishment projects as mitigation for impacts of the proposed shoreline protective

device on beach sand supply and shoreline processes. The following is the methodology used by Commission staff develop the in-lieu fee amount. The methodology uses site-specific information provided by the applicant as well as estimates, derived from region-specific criteria, of both the loss of beach material and beach area which could occur over the life the structure, and of the cost to purchase an equivalent amount of beach quality material and to deliver this material to beaches in the project vicinity.

The following is a description of the methodology. The actual calculations which utilize values that are applicable to the subject sites, and were used as the basis for calculating the estimated range of the mitigation fee, are attached as Exhibit A to this report.

Fee = (Volume of sand for mitigation) x (unit cost to buy and deliver sand)

$$M = V_t \times C$$

where

M = Mitigation Fee

V_t = Total volume of sand required to replace losses due to the structure, through reduction in material from the bluff, reduction in nearshore area and loss of available beach area (cubic yards). Derived from calculations provided below.

C = Cost, per cubic yard of sand, of purchasing and transporting beach quality material to the project vicinity (\$ per cubic yard). Derived from the average of three written estimates from sand supply companies within the project vicinity that would be capable of transporting beach quality material to the subject beach, and placing it on the beach or in the near shore area.

$$V_t = V_b + V_w + V_e$$

where

V_b = Volume of beach material that would have been supplied to the beach if natural erosion continued, based on the long-term regional bluff retreat rate, design life of the structure, percent of beach quality material in the bluff, and bluff geometry (cubic yards). This is equivalent to the long-term reduction in the supply of bluff material to the beach resulting from the structure.

V_w = Volume of sand necessary to replace the beach area that would have been created by the

natural landward migration of the beach profile without the seawall, based on the long-term regional bluff retreat rate, and beach and nearshore profiles (cubic yards)

V_e = Volume of sand necessary to replace the area of beach lost due to encroachment by the seawall; based on the seawall design and beach and nearshore profiles (cubic yards)

$$V_b = (S \times W \times L/27) \times [(R h_s) + (h_u/2 \times (R + (R_{cu} - R_{cs})))]$$

where

R = Long-term regional bluff retreat rate (ft./yr.), based on historic erosion, erosion trends, aerial photographs, land surveys, or other accepted techniques. For the Encinitas area, this regional retreat has been estimated to be 0.2 ft./year. This value may be used without further documentation. Alternative retreat rates must be documented by the applicant and should be the same as the predicted retreat rate used to estimate the need for shoreline armoring.

L = Design life of armoring without maintenance (yr.) If maintenance is proposed and extends the life of the seawall beyond the initial estimated design life, a revised fee shall be determined through the coastal development permit process.

W = Width of property to be armored (ft.)

h = Total height of armored bluff (ft.)

S = Fraction of beach quality material in the bluff material, based on analysis of bluff material to be provided by the applicant

h_s = Height of the seawall from the base to the top (ft)

h_u = Height of the unprotected upper bluff, from the top of the seawall to the crest of the bluff (ft)

R_{cu} = Predicted rate of retreat of the crest of the bluff, during the period that the seawall would be in place, assuming no seawall were installed (ft/yr). This value can be assumed to be the same as R unless the applicant provides site-specific geotechnical information supporting a different value.

R_{cs} = Predicted rate of retreat of the crest of the bluff, during the period that the seawall would be in place, assuming the seawall has been installed (ft/yr). This value will be assumed to be zero unless the applicant provides site-specific geotechnical information supporting a different value.

NOTE: For conditions where the upper bluff retreat will closely follow the lower bluff, this volume will approach a volume of material equal to the height of the total bluff, the width of the property and a thickness equal to the total bluff retreat that would have occurred if the seawall had not been constructed. For conditions where the upper bluff has retreated significantly and would not be expected to retreat further during the time that the seawall is in place, this volume would approach the volume of material immediately behind the seawall, with a thickness equal to the total bluff retreat that would have occurred if the seawall had not been constructed.

$$V_w = R \times L \times v \times W$$

where

R = Long-term regional bluff retreat rate (ft./yr.), based on historic erosion, erosion trends, aerial photographs, land surveys, or other accepted techniques. For the Encinitas area, this regional retreat has been estimated to be 0.2 ft./year. This value may be used without further documentation. Alternative retreat rates must be documented by the applicant and should be the same as the predicted retreat rate used to estimate the need for shoreline armoring.

L = Design life of armoring without maintenance (yr.) If maintenance is proposed and extends the life of the seawall beyond the initial estimated design life, a revised fee shall be determined through the coastal development permit process.

v = Volume of material required, per unit width of beach, to replace or reestablish one foot of beach seaward of the seawall; based on the vertical distance

from the top of the beach berm to the seaward limit of reversible sediment movement (cubic yards/ft of width and ft. of retreat). The value of v is often taken to be 1 cubic yard per square foot of beach. In the report, "Oceanside Littoral Cell Preliminary Sediment Budget Report" (December 1987, part of the Coast of California Storm and Tide Wave Study, Document #87-4), a value for v of 0.9 cubic yards/square foot was suggested. If a vertical distance of 40 feet is used for the range of reversible sediment movement, v would have a value of 1.5 cubic yards/square foot (40 feet x 1 foot x 1 foot / 27 cubic feet per cubic yard). These different approaches yield a range of values for v from 0.9 to 1.5 cubic yards per square foot. The value for v would be valid for a region, and would not vary from one property to the adjoining one. Until further technical information is available for a more exact value of v , any value within the range of 0.9 to 1.5 cubic yards per square foot could be used by the applicant without additional documentation. Values below or above this range would require additional technical support.

$W =$ Width of property to be armored (ft.)

$$V_e = E \times W \times v$$

where

$E =$ Encroachment by seawall, measured from the toe of the bluff or back beach (ft.)

$W =$ Width of property to be armored (ft.)

$v =$ Volume of material required, per unit width of beach, to replace or reestablish one foot of beach seaward of the seawall, as described above;

The San Diego Association of Governments (SANDAG) has adopted the Shoreline Preservation Strategy for the San Diego region and is currently working on techniques toward its implementation. The Strategy considers a full range of shoreline management tactics, but emphasizes beach replenishment to preserve and enhance the environmental quality, recreational capacity, and property protection benefits of the region's shoreline. Funding from a variety of sources will be required to implement the beach replenishment and maintenance programs identified in the SANDAG Strategy. In this particular case, SANDAG has agreed to administer a program which would identify projects which may be appropriate for support from the beach sand replenishment fund, through input from

the Shoreline Erosion Committee which is made up of representatives from all the coastal jurisdictions in San Diego County. The Shoreline Erosion Committee is currently monitoring several large scale projects, both in and out of the coastal zone, they term "opportunistic sand projects", that will generate large quantities of beach quality material suitable for replenishing the region's beaches. The purpose of the account is to aid in the restoration of the beaches within San Diego County. One means to do this would be to provide funds necessary to get such "opportunistic" sources of sand to the shoreline.

The applicant is being required to pay a fee in-lieu of directly depositing the sand on the beach, because the benefit/cost ratio of such an approach would be too low. Most of the adverse effects of the seawall on sand supply will occur gradually. In addition, the adverse effects impact the entire littoral cell but to different degrees in different locations throughout the cell (based upon wave action, underwater canyons, etc.) Therefore, mitigation of the adverse effects on sand supply is most effective if it is part of a larger project that can take advantage of the economies of scale and result in quantities of sand at appropriate locations in the affected littoral cell in which it is located. The funds will be used only to implement projects which benefit the area where the fee was derived, and provide sand to the region's beaches, not to fund operations, maintenance or planning studies. Such a fund will aid in the long-term goal of increasing the sand supply and thereby reduce the need for additional armoring of the shoreline in the future. The fund also will insure available sandy beach for recreational uses. The methodology, as proposed, ensures that the fee is roughly proportional to the impacts to sand supply attributable to the proposed seawall. The methodology provides a means to quantify the sand and beach area that would be available for public use, were it not for the presence of the seawall.

The above-described impacts on the beach and sand supply have previously been found to result from seawalls in other areas of Encinitas. In March of 1993, the Commission approved CDP #6-93-85/Auerbach, et al for the construction of a seawall fronting six non-continuous properties located approximately 900 ft. north of the subject site. In its finding for approval, the Commission found the proposed shoreline protection would have specific adverse impacts on the beach and sand supply and required mitigation for such impacts as a condition of approval. The Commission made a similar finding for several other seawall developments along Neptune Avenue (ref. CDP Nos. 6-93-36-G/Clayton, 6-93-131/Richards, et al, 6-93-136/Favero, 6-95-66/Hann and 6-98-39/Denver/Canter).

In addition to the adverse impacts the seawall will have on the beach as detailed above, the Commission finds that the proposed seawall could also have adverse impacts on adjacent unprotected properties caused by wave reflection, which leads to accelerated erosion. Numerous studies have indicated that when continuous protection is not provided, unprotected adjacent properties experience a greater retreat rate than would occur if the protective device were not present. This is due primarily to wave reflection off the protective structure and from increased turbulence at the terminus of the seawall. According to James F. Tait and Gary B. Griggs in Beach Response to the Presence of a Seawall (A Comparison of Field Observations) "[t]he most prominent example of lasting

impacts of seawalls on the shore is the creation of end scour via updrift sand impoundment and downdrift wave reflection. Such end scour exposes the back beach, bluff, or dune areas to higher swash energies and wave erosion." As such, as the base of the bluff continues to erode on the unprotected adjacent properties, failure of the bluff is likely. Thus, future failures could "spill over" onto other adjacent unprotected properties, prompting requests for much more substantial and environmentally damaging seawalls to protect the residences. This then starts a "domino" effect of individual requests for protection.

In response to these concerns, the applicant's engineer has noted that the proposed seawall has incorporated a number of features into its design to reduce the potential for accelerated erosion on adjacent unprotected properties. First, the subject seawall will be keyed into the existing seawall to the south which eliminates any "end effects" at this connection. Also, the minimal thickness of the seawall will reduce the turbulence at the end of the wall which can lead to accelerated erosion of adjacent unprotected bluffs. In addition, because of the deteriorating condition of adjacent northern bluff, it is very likely that a request for shoreline protection for the northern property will be forthcoming which could tie into this seawall.

Although the proposed seawall design includes the design features described above to reduce impacts of the wall on adjacent properties, at best, the above-described impacts can be reduced, but not eliminated. In addition, the reduction in end turbulence due to minimal thickness of the wall is only a temporary effect. The proposed seawall design also includes a return wall at the end of the northern end of the seawall. This return wall will go into the bluff perpendicular to the wall and the bluff face. This return wall is an important component of a seawall as it protects the wall from wave flanking, which could lead to erosion behind the wall. Regardless of whether accelerated erosion were to occur on the adjacent unprotected property, these adjacent bluffs will continue to erode due to the same forces that are causing them to erode currently. As this occurs, more surface area of the return wall is exposed to wave attack leading to increased turbulence and accelerated erosion of the adjacent unprotected bluff.

According to information contained in the Planners Handbook (dated March 1993), which is included as Technical Appendix III of the Shoreline Preservation Strategy adopted by the San Diego Association of Governments (SANDAG) on October 10, 1993, "[a] longer return wall will increase the magnitude of the reflected wave energy. On a coast where the shoreline is retreating, there will be strong incentives to extend the length of the return wall landward as adjacent property is eroded, thereby increasing the return wall, and its effects on neighboring property, with time."

As described previously, the applicant's engineer has proposed a number of design features into the seawall to reduce the potential for accelerated erosion on the adjacent properties. However, in order to monitor these effects, Special Condition #2 requires the applicant to submit a monitoring report which evaluates the condition and performance of the seawall and overall site stability, and submit an annual report with recommendations, if any, for necessary maintenance, repair, changes or modifications to the project.

Special Condition #4 requires a deed restriction to ensure that the applicant and subsequent owners of the property are aware that alternative measures must be implemented on the applicant's blufftop property in the future, should additional stabilization be required, which would avoid additional alteration of the natural landform of the public beach or coastal bluffs, but would stabilize the principle residential structures and provide reasonable use of the property.

Although many repair and maintenance activities are exempt from coastal development permit requirements under Section 30610(d), such activities that enlarge or expand a structure are not exempt. In addition, certain methods of repair and maintenance of seawalls are not exempt (see California Code of Regulations Section 13252). Special Condition #7 advises the applicants that ongoing maintenance and repair activities which may be necessary in the future could require permits. The Coastal Commission should be contacted prior to undertaking any repairs to determine permit requirements. Moreover, the applicants are proposing to construct the development in an area subject to wave and storm hazards. Although the applicants' geotechnical report asserts that the proposed development can withstand such hazards and protect existing development from such hazards, the risk of damage to the structure and the existing development cannot be eliminated entirely. The Commission finds that in order for the proposed development to be consistent with the Coastal Act, the applicants must assume the risks of damage from flooding and wave action. As such, Special Condition #5 requires the applicants to execute assumption of risk documents, waiving any liability on the part of the Commission for approving the proposed development. In addition, these conditions require the applicants to indemnify the Commission in the event that third parties bring an action against the Commission as a result of failure of the proposed development to withstand and protect against the hazards.

To assure the proposed shore/bluff protection has been constructed to withstand serious episodic storms, Special Condition #6 has been proposed. This condition requires that, within 60 days of issuance of the permit, a certification by a registered civil engineer be submitted that verifies the proposed seawall has been constructed to withstand storms comparable to the winter storms of 1982-83.

In summary, the applicants have documented that the existing residences on the bluff top are in danger from erosion and bluff failure. Thus, the Commission is required to approve protection for the homes pursuant to Section 30235 of the Act. There are no other less damaging feasible alternatives available to reduce the risk from bluff erosion. Since the proposed seawall, even as minimally designed, will have adverse impacts on beach sand supply, Special Conditions require the applicant to pay an in-lieu mitigation fee to offset this impact. Therefore, as conditioned, the Commission finds that the proposed seawall is consistent with Sections 30235 and 30253 of the Coastal Act.

3. Visual Resources/Alteration of Natural Landforms. Section 30251 of the Coastal Act states, in part:

The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas.

The proposed development will occur at the base of an approximately 95 ft. coastal bluff fronting a City public beach park. A 480 foot-long seawall, identical in design to the proposed development, lies immediately south of the subject site. Below grade upper bluff retention systems have been installed above the subject site and above the 480 foot-long seawall to the south. The bluffs north of the site have a variety of permitted and unpermitted upper bluff retention systems and seawalls. The adjacent northern lot includes a number of unpermitted mid-bluff stabilization structures and seawalls which have failed resulting in repeated bluff failures.

While the surrounding bluffs are currently armored with a variety of shore and bluff protective structures as noted above, the proposed 13-foot high seawall to be constructed along the base of the bluff still raises concerns relative to its adverse impacts on visual resources within this scenic coastal area. In order to address this concern and reduce potential adverse visual impacts associated with the proposed development, the proposed seawall has been minimally designed with the proposed height of approximately 13 ft. above MSL. The seawall will be placed as close to the bluff as possible and follow the natural contour of the bluff. In addition, a surface treatment will be incorporated that allows for coloring and texturing of the seawall to reduce the contrast between the wall and the adjacent natural bluff. Therefore, as conditioned, the Commission finds that potential visual impacts associated with the proposed development have been reduced to the maximum extent feasible, consistent with Section 30251 of the Coastal Act.

4. Public Access/Recreation. Pursuant to Section 30604 (c), the Coastal Act emphasizes the need to protect public recreational opportunities and to provide public access to and along the coast. Section 30210 of the Coastal Act is applicable to the proposed development and states:

In carrying out the requirement of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.

In addition, Section 30212 of the Act is applicable and states, in part:

- (a) Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where:

- (1) it is inconsistent with public safety, military security needs, or the protection of fragile coastal resources,
- (2) adequate access exists nearby....

Additionally, Section 30220 of the Coastal Act provides:

Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.

The project site is located on a public beach utilized by local residents and visitors for a variety of recreational activities. The beach is owned by either the City of Encinitas or is State Lands. The site is located approximately one block north of the City of Encinitas' "Stone Steps" public access stairway. The proposed seawall will be constructed on sandy beach area that is currently available to the public. The project will have several adverse impacts on public access.

The proposed seawall, although minimally designed, will project approximately two ft. seaward of the toe of the bluff. Although the seaward encroachment of the wall is only two feet, the beach along this area of the coast is narrow and at high tides and winter beach profiles, the public may be forced to walk virtually at the toe of the bluff or the area is impassable. As such, any encroachment of structures, no matter how small, onto the sandy beach in this area, reduces the beach area available for public use. This is particularly true given the existing beach profiles and relatively narrow beach.

In addition to the above described direct interference with public access by the proposed seawall, there are a number of indirect effects as well. Shoreline processes, sand supply and beach erosion rates are all affected by shoreline structures and thus can alter public access and recreational opportunities.

The precise impact of shoreline structures on the beach is a persistent subject of controversy within the discipline of coastal engineering. However, the Commission is led to the conclusion that if a seawall works effectively on a retreating shoreline, it results in impacts on the beach. As discussed previously, the construction of a shore/bluff protective structure has a number of quantifiable and not so quantifiable impacts on the local sand supply on the adjacent sandy beach. Briefly stated, the seawall will halt natural bluff retreat, preventing bluff material from becoming part of the sand supply; will physically occupy beach area, displacing recreational use of a public beach, thereby creating a burden on the public; will halt the landward migration of the beach; and, the vertical seawall can cause increased turbulence, accelerating the pace of sand scour, steepening the beach profile and causing the beach to become narrower and eventually disappear. Additionally, seawalls can lead to accelerated erosion of the adjacent unprotected bluff due to wave reflection.

Although the proposed seawall adheres closely to the contour of the natural bluff, the seawall will reduce lateral beach access by encroaching onto the beach and will have adverse impacts on the

natural shoreline processes. The Commission finds that the probable negative impacts of the seawall must be weighed against the property owner's need to protect the structure behind it. The Commission further recognizes that any type of shoreline protective devices have been shown to have adverse impacts upon the beach. As stated elsewhere in these findings, Section 30235 of the Act allows for the use of such a device where it is required to protect existing development and where it has been designed to mitigate adverse impacts upon shoreline sand supply. In order to mitigate the known adverse impacts, the Commission typically requires an offer of dedication of lateral public access in order to balance the burden placed on the public with a public benefit. However, in this case, the City and the State Lands Commission have both agreed that the MHTL currently is at the toe of the existing bluff. As such, public access is assured through the public ownership of the beach. In addition, impacts of the seawall on the beach will be mitigated by Special Condition #1, discussed in a previous section of the staff report, which requires the applicant pay an in-lieu fee for sand replenishment. Therefore, as conditioned, the Commission finds the proposed development to be consistent with the public access policies of the Coastal Act.

5. Local Coastal Planning. Section 30604 (a) also requires that a coastal development permit shall be issued only if the Commission finds that the permitted development will not prejudice the ability of the local government to prepare a Local Coastal Program (LCP) in conformity with the provisions of Chapter 3 of the Coastal Act. In this case, such a finding can be made.

The subject site is located on the beach within the City of Encinitas. In November of 1994, the Commission approved, with suggested modifications, the City of Encinitas Local Coastal Program (LCP). Subsequently, on May 15, 1995, coastal development permit authority was transferred to the City. Although the site is within the City of Encinitas, it is within the Commission's area of original jurisdiction. As such, the standard of review is Chapter 3 policies of the Coastal Act, with the City's LCP used as guidance.

As shoreline erosion along the coast rarely affects just one individual property, it is imperative that a regional wide solution to the shoreline erosion problem be addressed and solutions developed to protect the beaches. Combined with the decrease of sandy supply from coastal rivers and creeks and armoring of the coast, beaches will continue to erode without being replenished. This will, in turn, decrease the public's ability to access and recreate on the shoreline.

Based on specific policy and ordinance language requirements placed in the LCP by the Commission, the City of Encinitas is in the process of developing a comprehensive program addressing the shoreline erosion problem in the City. The intent of the plan is to look at the shoreline issues facing the City and to establish goals, policies, standards and strategies to comprehensively address the identified issues. To date, the City has conducted several public workshops and meetings on the comprehensive plan to identify issues and present draft plans for comment. However, at this time it is uncertain when the plan will come before the Commission as an LCP amendment or when it will be scheduled for local review by the Encinitas City Council.

In the case of the proposed project, site specific geotechnical evidence has been submitted indicating that the existing structures on the project site are in danger. The Commission feels strongly that approval of the proposed project should not send a signal that there is no need for site specific geotechnical review to determine the safe location for placement of new development on the blufftop. This approach would result in total armoring of the shoreline where there is any existing development even if the development is not in danger from erosion, inconsistent with Section 30253 and the public access and recreation policies of the Coastal Act. Although the erosion potential on the subject site is such that action must be taken promptly, decisions regarding future shoreline protection should be done through a comprehensive planning effort that analyzes the impact of such a decision on the entire reach, not through "piece meal" construction of seawalls for individual properties which could further exacerbate the problem. Planning for comprehensive protective measures which may include a combination of continual lower bluff protection constructed in substantial segments, limits on future bluff development and ground and surface water controls, in conjunction with beach replenishment, should occur to avoid the need for substantial alteration of the natural landform in the future.

Based on the above findings, the proposed seawall development has been found to be consistent with the Chapter 3 policies of the Coastal Act in that the need for the seawall has been documented, its adverse impacts on public access, beach sand supply and potential impacts to adjacent unprotected properties will each be mitigated. Therefore, the Commission finds that approval of the proposed seawall development will not prejudice the ability of the City of Encinitas to prepare a comprehensive plan addressing the City's coastline as required in the certified LCP and consistent with Chapter 3 policies.

6. Consistency with the California Environmental Quality Act (CEQA).
Section 13096 of the Commission's Code of Regulations requires Commission approval of Coastal Development Permits to be supported by a finding showing the permit, as conditioned, to be consistent with any applicable requirements of the California Environmental Quality Act (CEQA). Section 21080.5(d)(2)(A) of CEQA prohibits a proposed development from being approved if there are feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse effect which the activity may have on the environment.

The proposed project has been conditioned in order to be found consistent with the geologic stability and public access policies of the Coastal Act. Mitigation measures will minimize all adverse environmental impacts. As conditioned, there are no feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse impact which the activity may have on the environment. Therefore, the Commission finds that the proposed project, as conditioned, is the least environmentally-damaging feasible alternative and can be found consistent with the requirements of the Coastal Act to conform to CEQA.

STANDARD CONDITIONS:

1. Notice of Receipt and Acknowledgment. The permit is not valid and development shall not commence until a copy of the permit, signed by the permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.
2. Expiration. If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.
3. Compliance. All development must occur in strict compliance with the proposal as set forth below. Any deviation from the approved plans must be reviewed and approved by the staff and may require Commission approval.
4. Interpretation. Any questions of intent or interpretation of any condition will be resolved by the Executive Director or the Commission.
5. Inspections. The Commission staff shall be allowed to inspect the site and the development during construction, subject to 24-hour advance notice.
6. Assignment. The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.
7. Terms and Conditions Run with the Land. These terms and conditions shall be perpetual, and it is the intention of the Commission and the permittee to bind all future owners and possessors of the subject property to the terms and conditions.

EXHIBIT A

Beach Sand Replenishment
In-lieu Fee Worksheet
528-554 Neptune Avenue
CDP #6-98-133

$V_e =$ Volume of sand to rebuild the area of beach lost due to encroachment by the seawall; based on the seawall design and beach and nearshore profiles (cubic yards)

$$V_e = A_e \times v$$

$A_e =$ The encroachment area which is equal to the width of the properties which are being protected (W) times the seaward encroachment of the protection (E)

$$A_e = W \times E$$

$W =$ Width of property to be armored (ft.)

$E =$ Encroachment by seawall, measured from the toe of the bluff or back beach to the seaward limit of the protection (ft.)

$v =$ Volume of material required, per unit width of beach, to replace or reestablish one foot of beach seaward of the seawall; based on the vertical distance from the top of the beach berm to the seaward limit of reversible sediment movement (cubic yards/ft. of width and ft. of retreat). The value of v is often taken to be 1 cubic yard per square ft. of beach. If a vertical distance of 40 feet is used for the range of reversible sediment movement, v would have a value of 1.5 cubic yards/square ft. (40 feet x 1 foot x 1 foot/27 cubic feet per cubic yard). If the vertical distance for a reversible sand movement is less than 40 feet, the value of v would be less than 1.5 cubic yards per square foot. The value of v would be less than 1.5 cubic yards per square foot. The value of v will vary from one coastal region to another. A value of 0.9 cubic yards per square foot has been suggested for the Oceanside Littoral Cell (Oceanside Littoral Cell Preliminary Sediment Budget Report, December 1997, prepared as part of the Coast of California Storm and Tide Wave Study)

$V_w =$ Volume of sand to rebuild the area of beach lost due to long-term erosion (V_w) of the beach and near-shore, resulting from stabilization of the bluff

face and prevention of landward migration of the beach profile; based on the long-term regional bluff retreat rate, and beach and nearshore profiles (cubic yards)

$$V_w = A_w \times v$$

A_w = The area of beach lost due to long-term erosion is equal to the long-term average annual erosion rate (R) times the number of years that the back beach or bluff will be fixed (L) times the width of the property that will be protected (W) (ft./yr.)

$$A_w = R \times L \times W$$

R = The retreat rate which must be based on historic erosion, erosion trends, aerial photographs, land surveys, or other acceptable techniques and documented by the applicant. The retreat rate should be the same as the predicted retreat rate used to estimate the need for shoreline armoring

L = The length of time the back beach or bluff will be fixed or the design life of the armoring without maintenance (yr.). For repair and maintenance projects, the design life should be an estimate of the additional length of time the proposed maintenance will allow the seawall to remain without further repair or replacement

V_b = Amount of beach material that would have been supplied to the beach if natural erosion continued, or the long-term reduction in the supply of bluff material to the beach, over the life of the structure; based on the long-term average retreat rate, design life of the structure, percent of beach quality material in the bluff, and bluff geometry (cubic yards)

$$V_b = (S \times W \times L) \times [(R \times h_s) + (1/2 h_u \times (R + (R_{cu} - R_{cs})))]/27$$

S = Fraction of beach quality material in the bluff material, based on analysis of bluff material to be provided by the applicant

h_s = Height of the seawall from the base of the bluff to the top (ft.)

h_u = Height of the unprotected upper bluff, from the top of the seawall to the crest of the bluff (ft.)

R_{cu} = Predicted rate of retreat of the crest of the bluff, during the period that the seawall would be in place, assuming no seawall were

installed (ft./yr.). This value can be assumed to be the same as R unless the applicant provides site specific geotechnical information supporting a different value

R_{cs} = Predicted rate of retreat of the crest of the bluff, during the period that the seawall would be in place, assuming the seawall has been installed (ft./yr.). This value will be assumed to be zero unless the applicant provides site specific geotechnical information supporting a different value

V_t = Total volume of sand required to replace losses due to the structure, through reduction in material from the bluff, reduction in nearshore area and loss of available beach area (cubic yards). Derived from calculations provided above

$$V_t = V_b + V_w + V_e$$

$$M = V_t \times C$$

C = Cost, per cubic yard of sand, of purchasing and transporting beach quality material to the project vicinity (\$ per cubic yard). Derived from the average of three written estimates from sand supply companies within the project vicinity that would be capable of transporting beach quality material to the subject beach, and placing it on the beach or in the near shore area

528-554 Neptune Avenue
(Gozzo/Sawtelle/Fischer)

W = 120 ft.
E = 2 ft.
v = .9 cubic yards per square ft.
R = .2 ft./yr.
L = 22.5 years
S = .64
h_s = 13 ft.
h_u = 82 ft.
R_{cu} = .2 ft./yr.
R_{cs} = 0
C = \$7.20

$$V_e = A_e \times v$$

$$V_e = 2 \times 120 \times .9 = \underline{216 \text{ cubic yards}}$$

$$V_w = A_w \times v$$

$$V_w = .2 \times 22.5 \times .9 \times 120 = \underline{486 \text{ cubic yards}}$$

$$V_b = (S \times W \times L) \times [(R \times h_s) + (1/2 h_u \times (R + (R_{cu} - R_{cs})))]/27$$

$$V_b = (.64 \times 120 \times .83) \times [(2.6) + 41 \times (.2 + (.2 - 0))] = \underline{1211.06 \text{ cubic yards}}$$

$$V_t = V_b + V_w + V_e$$

$$V_t = \underline{1211.06} + \underline{486} + \underline{216} = \underline{1913.06 \text{ cubic yards (subtotal)}}$$

Special Note:

Soil Engineering Construction has undertaken a field study to determine the estimated bluff/sand loss due to instability and resultant failure on the subject site. That study indicates that 826 cubic yards of bluff sands have already been removed from the face of the bluff due to bluff failure and accelerated erosion. Therefore, to calculate the amount of beach quality sand already removed from the bluff, this figure (826) must be multiplied by (S) or (.64), the determined fraction of beach quality

material in the bluff material.

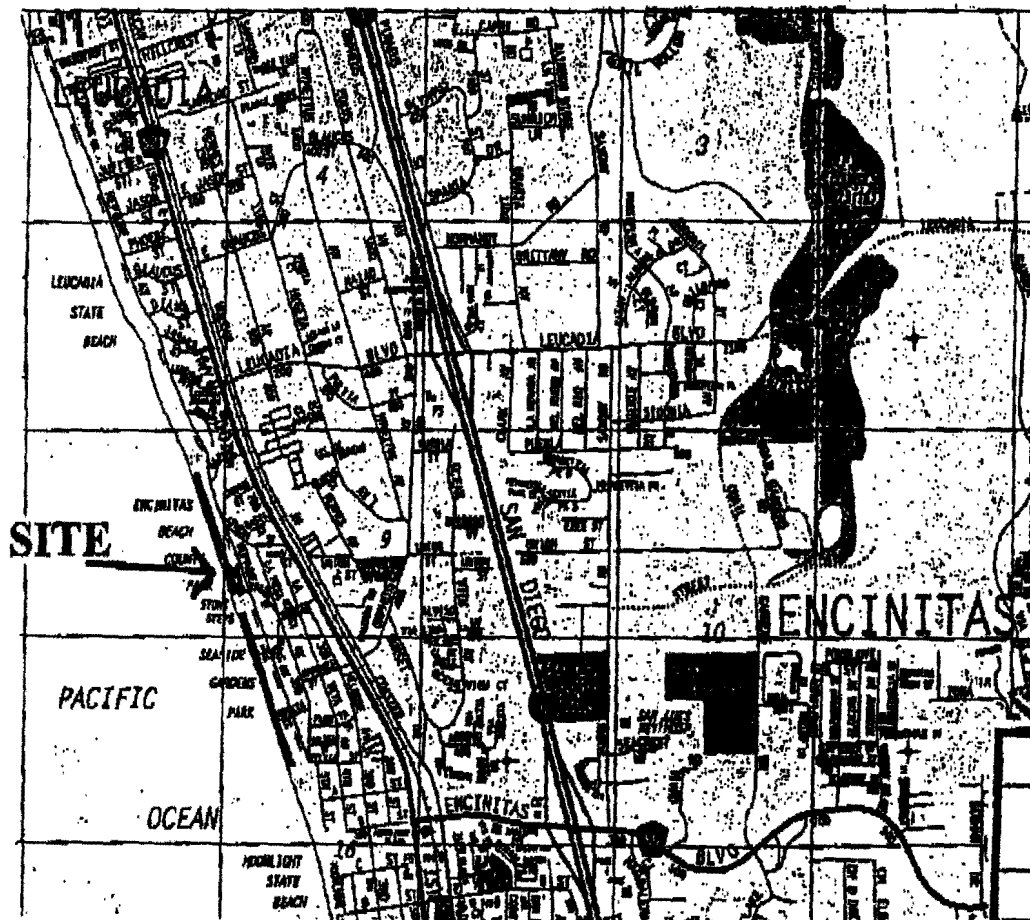
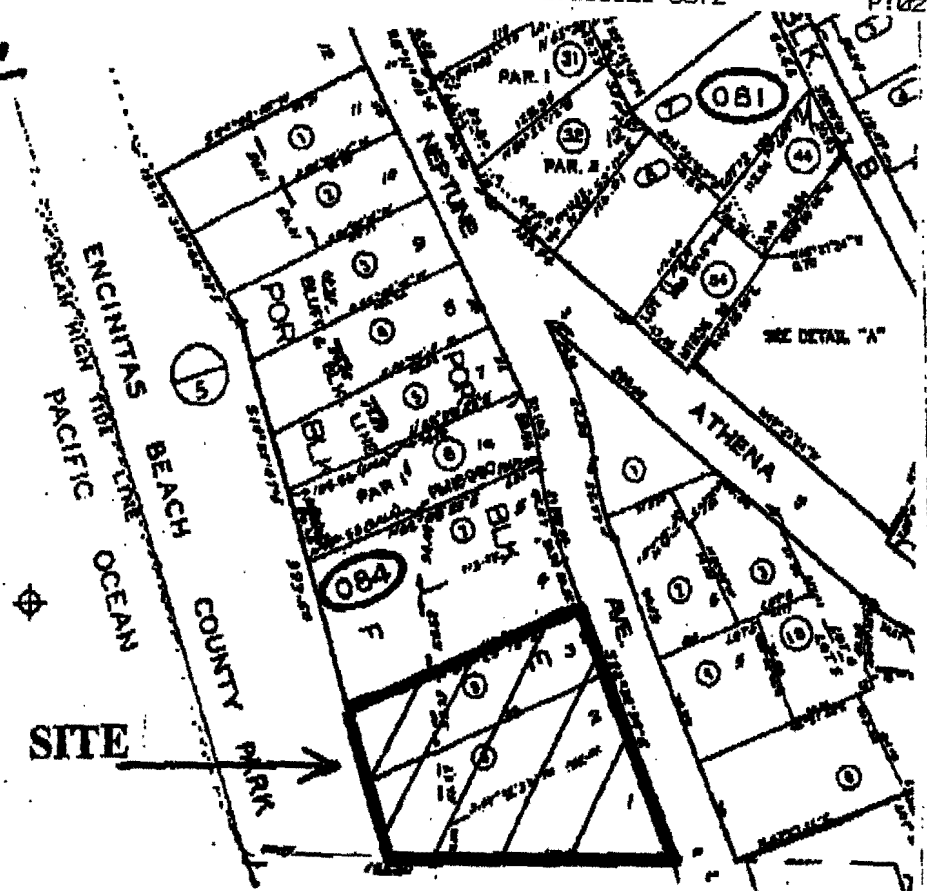
$$\underline{826} \times \underline{.64} = \underline{528.64} \text{ cubic yards}$$

$$\text{Therefore, the revised } V_t \text{ (total)} = \underline{1913.06} - \underline{528.64} = \underline{1,384.42} \text{ cubic yards}$$

$$M = V_t \times C$$

$$M = \underline{1,384.42} \times \underline{\$7.20} = \underline{\$9,967.82}$$

Wed 21c



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|-------------------------------|
| EXHIBIT NO. 1 |
| APPLICATION NO. |
| 6-98-133 |
| Location Map |
| California Coastal Commission |

30

20

10

0

SOUTH

R

NORTH

R

←N

Existing Richard's
Seawall

120'

APPROX. TOP OF
WALL +/- 13 FL

ROCK AND/OR

SEE DETAIL 6-2
AND USED THIS END

12' 6"

12' 6"

RETURNS TO BE DETERMINED
BY ENGINEER IN THE FIELD

WATER DRAIN 20"

4' WIDE 3" GRASS OR SIMILAR
W/ OUTLET AT APPROX. ELEVATION +/- 0.0'
ABOVE FORMATION AT 10 FEET O.C

APPROX. LOCATION OF FORMATION
MATERIALS. VARIES AS SHOWN

RETURNS TO BE DETERMINED
BY ENGINEER IN THE FIELD

12' 6"

EAST PROFILE

N.T.S.

PROFILE SHOWN DEPICTS A TYPICAL 4 PANEL SECTION OF THE MILL N.T.S.
ELEVATIONS AND DIMENSIONS CORRECT AS SHOWN

EXHIBIT NO. 3
APPLICATION NO.
6-98-133
Profile of Seawall

California Coastal Commission

30

20

10

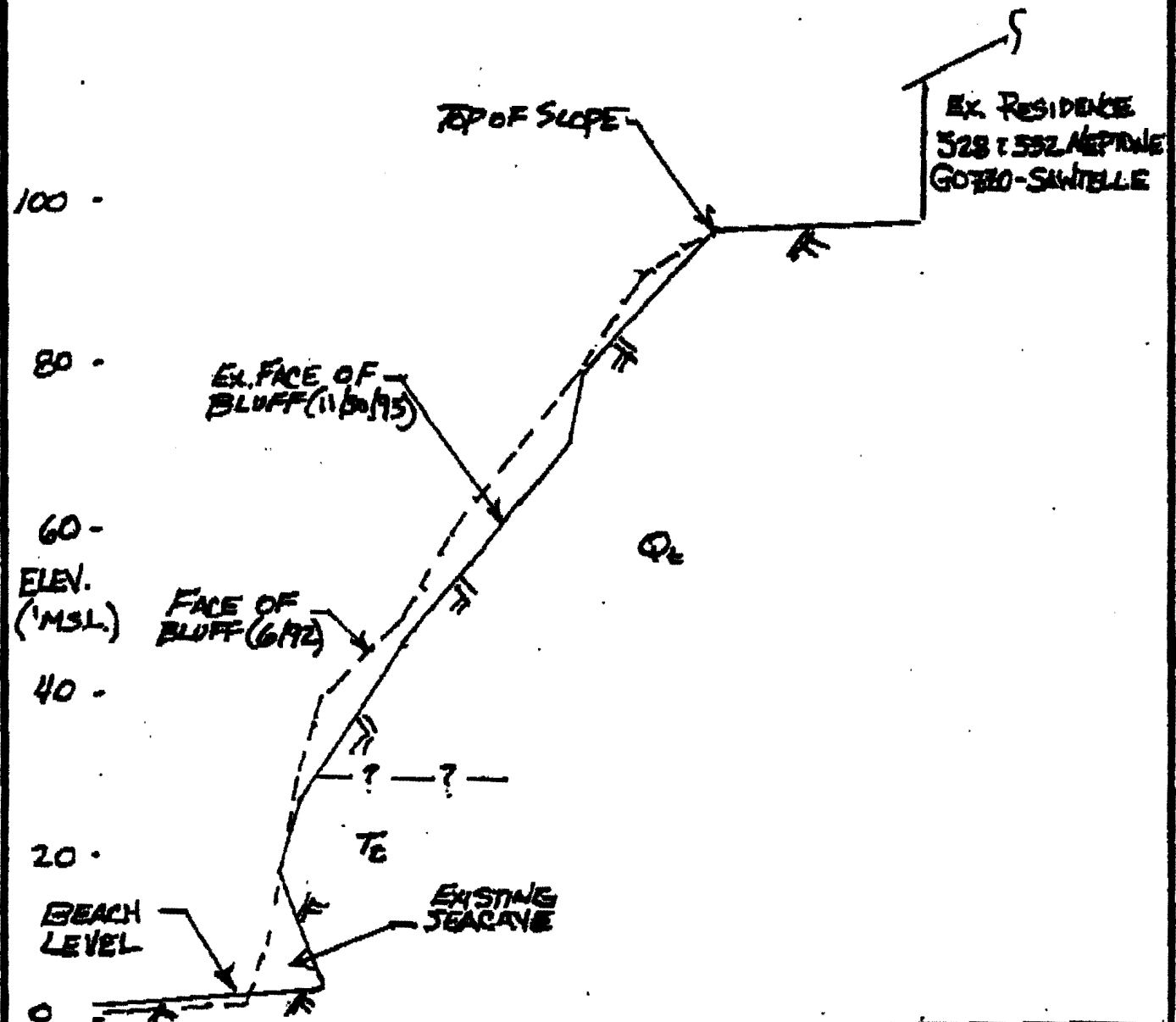
0

12'
RETURN PER
602

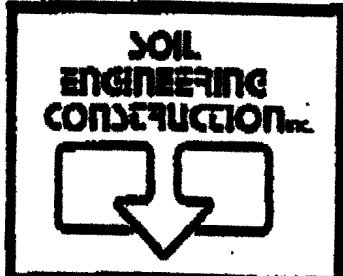
12' 6"

12' 6"

RETURNS TO BE DETERMINED
BY ENGINEER IN THE FIELD



H: 1" = 20'
V: 1" = 20'



X-SECTION A-A'

| |
|---|
| EXHIBIT NO. 4 |
| APPLICATION NO. 6-98-133 |
| Cross-Section Indicating Loss of Bluff Since 1992 |
| California Coastal Commission |
| DATE 11/30/95 |
| JOB NO. 951013 |
| FIGURE 2 |